Beans (Dry)

ATLANTIC PROVINCES VEGETABLE CROPS GUIDE TO PEST MANAGEMENT 2002 - 2003

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CANADA

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Introduction

Dry beans are, as snap beans, a member of the Leguminosae (legume family). *Phaseolus vulgaris* is the species and only differs from snap beans in that the seed is used after it is mature and dried.

Commercial cultivars are "bush types" which have a concentrated bloom. They reach maturity in early September (100 to 120 days from seeding). Yields range from 1000 to 3500 kg per hectare depending on the cultivar and the season.

The major types of dry beans are based primarily on physical appearance of the seed:
Navy, pea or white (small seed)
Small black (eg. "Black Turtle")
Red Kidney (dark or light)
Great Northern (large white)
Pinto (medium seed size)
Cranberry (large seed)
White Marrow (large seed)
Yellow-eye (large seed)
Heirloom ("Jacob's Cattle", "Soldier Bean")

Plant vigor, earliness, yields and seed quality vary dramatically with the cultivar.

Soil requirements regarding dry beans are for good drainage to a depth of 1 metre with low levels of diseases such as white mold and root rot. Soil nitrogen levels should be low such that excessive vegetative growth is not encouraged. Heavy soils can produce good bean yields as long as rainfall is not excessive so as to cause drowning out of the crop. Also, harvest may be more difficult than from sandy soils under wet fall conditions.

Beans are harvested from mid September to late October. They are dried and then marketed on a year round basis. Most beans produced in the Atlantic area are of the large seeded type. These find markets at roadside stands and are also delivered to wholesalers. Some beans, such as "Dark Red Kidney" are processed in Atlantic Canada. Many processing and export markets are possible if economics show we can be competitive.

Nutrient Content: Good source of protein, energy, calcium, iron, folic acid and vitamin E, as well as other nutrients to the diet. 250 mL (1 cup) contains approximately 220 kilocalories. Also, 250 mL (1 cup) cooked dried beans constitutes a meat alternate from Canada's Food Guide.

The protein value of beans is enhanced when beans are consumed with other foods such as whole grains. Cooking is essential to the use of beans for food as heat destroys "anti nutrition" factors.

Crop Establishment ▲ to Top

Obtain certified seed, although in many cases certified seed is not available, especially for the large seed cultivars. Purity of seed is needed to ensure uniformity of maturity at harvest time. It is important to select well developed, mature, uniform seed of sound vitality. Germination and seedling vigor may be affected by the overall quality and age of the seed. Poor seed quality can be expressed in reduced germination, poor seedling vigor and abnormalities of the seedlings. See the Atlantic Provinces Guide to Pest Management for seed treatments (extremely important for dry beans). Diseased seed will produce diseased plants which may infect the entire crop. Bean seed should be germination tested. For high yields, seed as early as possible (the last week of May or 1st week of June). Do not plant beans where risk of frost is high in the spring and where early frosts are possible, especially in late August. Plant only when soil temperatures have reached a minimum of 15°C. The optimum temperature for germination is 20°C. Temperatures too low (below 10°C) will cause poor pod set.

See Beans (Snap) Section for further information on seed treatment, seeding/planting.

Crop Management ▲ to Top

See Beans (Snap) section.

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Nutrition

See Beans (Snap) section. Nutrient removal by 1100 kg of dry beans:
N 70 kg, P 50 kg, K 40 kg, Ca 50 kg, Mg 14 kg, Cu .02 kg, Fe .5 kg, Mn .07 kg, Zn .05 kg.

Pests and Pest Control ▲ to Top

(For control of weeds, diseases and pests see under Beans (Snap).

The European Corn Borer can continue to consume beans after harvest if they make it to the storage bin.

Disinfection of all equipment and storages is essential for control of diseases, especially those that infect the seed.

Harvesting and Handling ▲ to Top

Harvest when most pods are yellow and dry but before they start shattering. Unevenness of maturity can lead to problems of either shattering or abrasion, discoloration or disease of immature beans. Desicants can be used to enhance uniform drying and crop maturity. Beans can be direct harvested or pulled and windrowed. Beans are pulled in the morning, when pods are damp and tough thereby lessening shatter. Vines are windrowed for subsequent pickup and threshing with a specialized bean combine; the time between pulling and combining should be minimized to avoid discoloration.

Storage and Conditioning ▲ to Top

Beans should be about 18% moisture at harvest. Low seed moisture can result in mechanical injury (split seed coats) so use extreme caution. Special drying techniques using heated and/or unheated air have been developed. If beans are not sold at harvest they can be stored in an elevator or granary. If seed moisture is below 15% the crop is ready for marketing or storage. High moisture seed must be dried slowly so the skin is not wrinkled or damaged. If there is a lot of foreign material in the beans, then natural heating must be prevented by aeration. Store beans at 5°C during the winter.

Bibliography ▲ to Top

(See also General References)

Beans in Canada - published annually (March) by Agri- book Magazine, Agricultural Information Services Ltd.

Diseases and Pests of Vegetable Crops in Canada, 1994. The Canadian Phytopathological Society and the Entomology Society of Canada. pp 211-223 and pp 468-472.

Dry Bean Production. August 1978. Principles and Practices (L.S. Robertson and R.D. Frazer, eds) Michigan State University Extension Bulletin, E-12512.

Meronuck, R.A. and L.L. Hardman. 1981. Edible Bean Disease and Disorder Identification. 4 pp.

Nuland, D.S., H.F. Schwartz and R.L. Foster. 1983. Recognition and management of Dry Bean Production Problems. 57 pp.

Tu, J.C. 1984. Bean Diseases and their Control. Publication 1758/E Research Station Agriculture Canada, Harrow, Ontario.

Hall, R. 1991. Compendium of Bean Diseases. The American Phytopathological Society. 73 pp.

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PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds ▲ to Top				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 3 to 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preplant Incorporated Treatments Germinating annual grasses and some broadleaf weeds	EPTAM 800 EC	4.25 to 5.5. L/ha	-	Must be applied to a dry clod-free soil surface and incorporated within 10 minutes. Use in conjunction with preemergence or postemergence herbicide for control of broadleaf weeds.
	trifluralin:			Incorporate within 8 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year. Use in conjunction with pre-emergence or postemergence herbicide for control of broadleaf weeds.
	TREFLAN 480 EC	1.2 to 2.3 L/ha	-	
	RIVAL 60 DF	1.0 to 1.9 kg/ha	-	
	BONANZA 400 EC	1.5 to 2.75 L/ha		
	DUAL II MAGNUM	1.15 to 1.75	-	Do not use on very sandy soils, or on soils high in organic matter. Use in conjunction with pre-

		L/ha		emergence or postemergence herbicide for control of broadleaf weeds. DUAL II MAGNUM can be used in white, kidney and pinto beans.
	EDGE 60 DC	1.1 to 1.9 kg/ha	-	Incorporate within 24 hours of application. Use in conjunction with a preemergence or postemergence herbicide for control of broadleaf weeds.
Preemergence Treatments Broadleaf weeds and annual grasses	AFESIN 200 EC	5.5 to 7.0 L/ha	-	Do not use on coarse sandy soil with less than 3% organic matter. Shallowly planted crops may be injured if heavy rains follow application. Some control of annual grasses may be obtained.
	DINOSEB PTK 300 EC	20.4 to 26.4 L/ha	-	For use on white bean only. Apply preemergence to crops and weeds. Do not use on very light soils, low in organic matter. Apply soon after planting in 250 to 400 L of water/ha. Check label for weeds controlled. **Dinoseb is not registered for use in New Brunswick.**
	PATORAN FL 400 SU	2.8 to 3.4 L/ha	-	Do not exceed the low rate on kidney beans. Use the lower rate on sandy soils but do not use on soils with less than 2% organic matter. Shallowly planted crops may be injured if heavy rains follow application. Partial grass control may be obtained.
	PATORAN 50 WP	2.25 to 2.75 kg/ha	-	
Grasses (Annual)	FRONTIER	1.4 L/ha	-	Apply only to white and kidney beans. Incorporation by rainfall or irrigation after application, is most effective.
Annual grasses and broadleaf weeds	PURSUIT	0.31 L/ha	-	Apply one application per year to white or kidney beans only. Rotational cropping restrictions apply.
Postemergence Treatments Broadleaf Weeds	BASAGRAN 480 Sn plus ASSIST oil conc.	1.75 to 2.25 L/ha plus 1 to 2 L/ha	-	Apply in 200 to 400 L water per hectare when beans are in the unifoliate to 4th trifoliate leaf stage and weeds are growing actively. Split applications may be necessary for Canada thistle control. Not residual.
	BASAGRAN FORTE	1.75 to 2.25 L/ha	-	Premix (No adjuvant needed).
Annual grasses	HOE-GRASS 284 EC	3.5 L/ha	-	Apply when annual grasses are in 1 to 4 leaf stage. Controls volunteer corn but not volunteer cereals, quackgrass or crabgrass. Do no tank mix with other herbicides.
	POAST 184 EC plus ASSIST oil conc. or MERGE	0.8 to 1.6 L/ha 2 L/ha 1 L/ha	80	Treat at the 1 to 6 leaf stage of annual grasses. Use the higher rate for control of volunteer cereals. Apply in 50 to 200 L/ha water.
	EXCEL SUPER 80.5	0.67 L/ha	60	Apply when annual grasses are in the 1 to 6 leaf stage and are actively growing. Excel can be tank mixed with Basagran for control of several

				broadleaf weeds. Use a minimum of 200 L of water per ha with the mixture.
Annual grasses and broadleaf weeds	EXCEL SUPER 80.5 plus BASAGRAN plus ASSIST oil conc.	0.67 L/ha 1.75 to 2.25 L/ha 2.0 L/ha	60	Add Basagran followed by Excel Super followed by Assist to a tank one-half full of water then complete filling. Do not use excessive agitation. Temporary crop injury possible during hot, humid conditions - when these conditions occur reduce oil concentrate (ASSIST) to 1 L/ha.
Emerged Quackgrass	POAST 184 Snplus ASSIST oil conc. or MERGE	1.60 L/ha 4 L/ha 2 L/ha	80	Apply at the 1 to 3 leaf stage of actively growing quackgrass in 110 to 200 L/ha water.
Harvest-Aid to burn off weeds	REGLONE plus AGRAL 90	2 to 2.75 L/ha 1 L/1000 L	80	Apply Reglone and Reglone Pro when 80% of pods have turned yellow. Do not apply Ignite to dry beans grown for seed. Apply Ignite when 50 tp 75% of the pods are yellow-brown. Apply Roundup or Roundup Fastforward Preharvest, 7 to 14 days before harvest, when grain moisture is less than 30%.
	REGLONE PRO IGNITE 15 Sn ROUNDUP L ROUNDUP FASTFOR-WARD PREHARVEST	1.5 to 2.0 L/ha 2.5 to 3.0 L/ha 2.5 L/ha 3.0 L/ha		
Insects ▲ to Top				
Seedcorn maggot				See "Seed Treatment"
Twospotted spider mite	CYGON 480 EC	0.7 to 1.0 L/ha	7	Most serious in dry years. Do not graze or feed crop refuse to livestock.
	DIMETHOATE 480 EC	0.7 to 1.0 L/ha	7	
	LAGON 480 EC	0.7 to 1.0 L/ha	7	
	KELTHANE 35 WP	1.1 to 1.75 kg/ha	7	Use low rate for small plants. Use high rate for larger plants.
European corn borer	GUTHION 50 WP	1.1 kg/ha	3	An occasional pest. Control requires carefully timed repeated applications. Apply in sufficient water to give complete coverage.
	APM 50 WP	1.1 kg/ha	3	
Diseases ▲ to Top				

Sclerotinia white mold	BENLATE 50 WP	1.75 to 2.25 kg/ha	14	Where white mold has been a serious problem in the past, apply Benlate 50 WP 1.75 kg/ha or Easout 50 WP 1.75 kg/ha or Senator 70 WP 1.75 kg/ha when 20-30% of the plants have one open blossom followed by Rovral 50 WP 1.0 kg/ha or Ronilan 50 EG 1.0 kg/ha, 5 days later. In fields without a history of severe disease, apply Benlate 50 WP 1.75 kg/ha or Easout 50 WP 1.75 kg/ha or Senator 70 WP 1.75 kg/ha or Rovral 50 WP 1.5 kg/ha or Ronilan 50 EG 1.5 kg/ha when 70-80% of the plants first have one open blossom. Effective control can only be achieved by using drop nozzles and high pressure so that spray contacts blossoms. When conditions are dry before and during bloom no fungicide is required.
	EASOUT 70 WP	1.75 to 2.25 kg/ha	14	
	SENATOR 70 WP	1.75 to 2.25 kg/ha	14	
	ROVRAL 50 WP	1.0 to 1.5 kg/ha	not after bloom	
	RONILAN 50 EG	1.0 to 1.5 kg/ha	45	
Bacterial Blights	FIXED COPPER	see label	1	At the first sign of disease and at 7 day intervals.